MATH 314   Linear Algebra   Fall 2025

Essential Information

time & place:	MWF 9:15am-10:15am Chapman Hall Room 104
instructor:	Jill Faudree
contact details:	Chapman 306B, jrfaudree@alaska.edu, 474-7385
office hours:	MWF 10:30am-11:30am Chap 306
	Th 1:00-2:00 (if available)
	Th 2:00-3:00 SSC
	and by appointment or just drop by.
	Current schedule available online
textbook:	**Introduction to Linear Algebra**, Gilbert Strang, any edition
software:	MATLAB or Octave (Both are available for free.)
webpage:	https://jrfaudree.github.io/LA/
canvas:	https://canvas.alaska.edu/courses/27088
prerequisites:	MATH 252 Calculus 2 or permission of instructor.

Course Description

The course description in the catalog reads as follows:

> Linear equations, finite dimensional vector spaces, matrices, determinants, linear transformations and characteristic values. Inner product spaces.

Linear algebra is the branch of mathematics which covers vectors, matrices, and linear equations. It is central to all areas of applied and pure mathematics, science and engineering, because vectors are the precise way to describe complicated things by using many numbers. Linear algebra is used when modeling natural phenomena and computing efficiently using models. Even nonlinear systems are approximated at first-order, using derivatives, by linear algebra objects.

Real-world linear algebra problems are solved using computers. In this course will introduce and use Matlab for this purpose. Matlab was designed for teaching linear algebra, and has become a standard tool for engineering and science; you may be expected to use it in your other courses. On the other hand, understanding linear algebra will require doing by-hand calculations with simple numbers and in low dimensions.

By the end of the course you will have a solid understanding of the fundamental concepts and algorithms of linear algebra, including well-known theorems and matrix factorizations. You will have seen important applications in diverse fields. You will be well-equipped to use linear algebra in more-advanced mathematics, and to use vectors and matrices in science and/or engineering.

Student Learning Outcomes A successful student in this course will:

- become fluent in linear combinations, bases, and matrix algebra

- apply linear algebra tools to applied problems such as dynamical systems and least squares fitting

- understand how QR factorization is used to solve matrix equations, including non-square systems

- use software to solve practical problems using skills from linear algebra

Course Mechanics

Class meetings will be a combination of lecture/demonstrations, whole class discussion, individual work, and small group work. Always bring paper/tablet and associated pen/pencil.

Class attendance is expected and I take roll daily, though it is not a part of your grade. If you miss a class, you should get notes from another student.

Reading the textbook is also essential. The author writes informally, but his presentation is full of conceptual insights that will aid your understanding. You should think of this textbook as giving you another lecture, to solidify what you already heard in class. (Strang's MIT lectures for this course are also free to watch online through the MITOpenCourseWare website.)

Homework

There will be a homework assignment due roughly every week, usually on Thursdays. Each week's assignment and due date will be announced in class and will be posted on the public webpage. Answers to homework problems will be posted in advance, and homework will be graded solely on completion. Nevertheless, your submission should be your own work. Copying and/or cut-and-paste work from other sources would be considered a violation of academic integrity.

Homework is submitted as a PDF in Gradescope. There is always a 3-day grace period except for the first two assignments.

Quizzes

Every Friday there will be a 15 minute quiz based on the homework due Thursday.

Midterms

There are two Midterm Exams this semester, to be held on the dates shown in the schedule. Midterms are given during the class time. Make-up Midterms will be given only for documented extenuating circumstances, at my discretion.

Final Exam

There will be a comprehensive Final Exam 8:00am-10:00am on Thursday December 11.

Rubric

Grades will be calculated according to the following rubric:

homework	15%
quizzes	15%
midterm 1	20%
midterm 2	20%
final exam	30%

Letter grades will be assigned according to the following scale. This scale is a guarantee; I reserve the right to lower the thresholds.

A+	97-100%	C+	77-79%	F	≤ 59
A	93-96%	C	70-76%		
A-	90-92%				
B+	87-89%	D+	67-69%		
B	83-86%	D	63-66%		
B-	80-82%	D-	60-62%		

Office Hours and Communication

My Weekly Schedule including office hours are available and updated online. Students can also schedule meetings with me outside of regular office hours, or email me at jrfaudree@alaska.edu.

I will use Canvas to send announcements. If I need to contact you outside of class times, I'll try to email via Canvas. Please set the email address in Canvas to one that you check regularly!

(tentative) Schedule of Topics

week	dates	topics	week	dates	topic
1	8/25 - 8/29	Ch 1	9	10/20 - 10/24	Ch 5,6
2	9/1 - 9/5	(Labor Day), Ch 2	10	10/27 - 10/30	Ch 6
3	9/8 - 9/12	Ch 2	11	11/2 - 11/7	Ch 6,
4	9/15 - 9/19	Ch 2	12	11/11 - 11/15	Ch 7, Midterm 2
5	9/22 - 9/26	Ch 3	13	11/18 - 11/22	Ch 7
6	9/29 - 10/3	Ch 3, Midterm 1	14	11/25 - 11/29	Ch 8, Thanksgiving
7	10/6 - 10/10	Ch 4	15	12/2 - 12/5	Ch 8
8	10/13 - 10/17	Ch 4,5	16	12/11	Final Exam, Thursday, 8:00am-10:00am

Rules and Policies

AI usage
Feel free to use a calculator or online tools on Homework. It is also reasonable to explore new AI tools like ChatGPT, but merely doing cut-and-paste without understanding will have no benefit to your learning.

Moreover, during proctored and on-paper Quizzes and Exams, electronic tools of any type are not allowed. Since Quizzes and Exams represent more than 75% of your grade, copying without understanding is not a good long-term strategy.

Incomplete Grade
Incomplete (I) will only be given in DMS courses in cases where the student has completed the majority (normally all but the last three weeks) of a course with a grade of C or better, but for personal reasons beyond his/her control has been unable to complete the course during the regular term. Negligence or indifference are not acceptable reasons for the granting of an incomplete.

Late Withdrawals
A withdrawal after the deadline from a DMS course will normally be granted only in cases where the student is performing satisfactorily (i.e., C or better) in a course, but has exceptional reasons, beyond his/her control, for being unable to complete the course. These exceptional reasons should be detailed in writing to the instructor, department head and dean.

No Early Final Examinations
Final examinations for DMS courses shall not be held earlier than the date and time published in the official term schedule. Normally, a student will not be allowed to take a final exam early. Exceptions can be made by individual instructors, but should only be allowed in exceptional circumstances and in a manner which doesn't endanger the security of the exam.

Academic Dishonesty
Academic dishonesty, including cheating and plagiarism, will not be tolerated. It is a violation of the Student Code of Conduct and will be punished according to UAF procedures.

Student protections and services statement

Every qualified student is welcome in my classroom. As needed, I am happy to work with you, Disability Services, Veterans' Services, Rural Student Services, etc. to find reasonable accommodations. Students at this University are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. As required, if I notice or am informed of certain types of misconduct, then I am required to report it to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: https://www.uaf.edu/orca/index.php.

Official UAF Syllabus Addendum

Student protections statement: The university respects and upholds the principles of due process and a fair and equitable process as specified in the Board of Regents' Policy 09.02 Student Rights and Responsibilities. For more information regarding the rights and responsibilities of students, refer to the Office of Rights, Compliance and Accountability website. You are encouraged to read the Board of Regents' policy carefully to fully understand your responsibilities to our community.

We strive to create a safe and respectful environment for all members of our community. If you have questions about expectations of you as a student or believe your rights are being violated, we encourage you to reach out to the Office of Rights, Compliance and Accountability for help. UAF reserves the right to suspend, expel or take other necessary and appropriate action in cases where a student is unable or unwilling to uphold community standards and campus safety.

For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site:
https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/

Disability services statement: I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities.

ASUAF advocacy statement: The Associated Students of the University of Alaska Fairbanks, the student government of UAF, offers advocacy services to students who feel they are facing issues with staff, faculty, and/or other students specifically if these issues are hindering the ability of the student to succeed in their academics or go about their lives at the university. Students who wish to utilize these services can contact the Student Advocacy Director by visiting the ASUAF office or emailing asuaf.office@alaska.edu.

Student Academic Support:

- Communication Center (907-474-7007, uaf-commcenter@alaska.edu, Student Success Center, 6th Floor Room 677 Rasmuson Library)

- Writing Center (907-474-5314, uaf-writing-center@alaska.edu, Student Success Center, 6th Floor Room 677 Rasmuson Library)

- UAF Math Services (907-474-7332, uaf-traccloud@alaska.edu)

    - Drop-in tutoring, Student Success Center, 6th Floor Room 672 Rasmuson Library
    - 1:1 tutoring (by appointment only), 6th Floor Room 677 Rasmuson Library

  – Online tutoring (by appointment only) available
     https://www.uaf.edu/dms/mathlab/, available at the Student Success Center

- Developmental Math Lab, Gruening 406

- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120,
  https://www.ctc.uaf.edu/student-services/student-success-center/)

- For more information and resources, please see the Academic Advising Resource List (https://www.uaf.edu/advising/students/index.php)

Student Resources:

- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, 110 Eielson Building)

- Student Health & Counseling [free counseling sessions available] (907-474-7043, https://www.uaf.edu/chc/appointments.php, Whitaker Building, Room 206, Health, Safety & Security Bldg — same building as Fire and Police)

- Office of Rights, Compliance and Accountability (907-474-7300, uaf-orca@alaska.edu, 3rd Floor, Constitution Hall)

- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.eduasuaf.office@alaska.edu, Wood Center 119)

Nondiscrimination statement: Nondiscrimination statement: The University of Alaska is an equal opportunity/equal access employer, educational institution and provider. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at www.alaska.edu/nondiscrimination.

UAF Office of Rights, Compliance and Accountability
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